

March 20, 2015

**West Lake Landfill
St. Louis, Missouri**

Issue: Release of Interim Data Summary of Ongoing Baseline Off-Site Air Monitoring Data for CO, H₂S, and SO₂

Background:

- The interim report prepared by the START Contractor, Tetra Tech, Inc., summarizes hydrogen sulfide (H₂S), sulfur dioxide (SO₂), and carbon monoxide (CO) measurements taken from June 1, 2014, to January 31, 2015, via RAE Systems, Inc., AreaRAE instruments.
- Air monitoring was conducted to (1) evaluate pre-construction concentrations of chemical and radiological parameters of potential concern in outdoor air, and (2) optimize the sampling and monitoring plan for the off-site air monitoring to occur during construction of the isolation barrier.
- As with the radiological and VOC data released in earlier reports, the CO, H₂S and SO₂ data were collected from the five off-site air monitoring locations:

Station 1 – Robertson Fire Protection District Station 2, 3820 Taussig Rd.

Station 2 – Pattonville Fire Department District, 13900 St Charles Rock Rd.

Station 3 – Pattonville Fire Department District Station 2, 3365 McKelvey Rd.

Station 4 – Spanish Village Park, 12827 Spanish Village Dr.

Station 5 – St. Charles Fire Department Station #2, 1550 S. Main St.

- The AreaRAE instruments were selected for use because they could be deployed to the field quickly and would provide near real-time measurements.
- At each of the five air monitoring stations, a measurements were recorded approximately every second following a non-zero measurement, or every three minutes following a zero measurement. Measurements were transmitted wirelessly to the EPA's field command post computer and then logged by the Environmental Response Team's Viper data management software. Due to the frequency of the recorded measurements, the files are too large to post on EPA's website as "raw" data.

- The EPA’s contractor and EPA reviewed and summarized the measurements for usability. Factors impacting usability are:
 - The reliability of the measurements reported by the AreaRAE for CO, H₂S, and SO₂ is approximately 20 percent of the amount of that chemical in the calibration gas, or about 10 ppm for CO and 2 ppm for H₂S and SO₂. These limitations are generally adequate for detecting releases that could cause acute exposures of concern; however, may render the measurements unusable for comparison to chronic health-based standards.
 - Measurements below the lowest amount of chemical in the instrument’s calibration gas are less reliable.
 - As reported by the AreaRAE manufacturer, the instruments have known cross-sensitivities. Notably, the H₂S and SO₂ sensors are reportedly cross-sensitive to CO.
 - The instruments are sensitive to field conditions, such as changes in the weather, especially barometric pressure and humidity.
 - The Viper data system summarized the data in rolling 8-hour time-weighted averages. If there was a problem with the instrument that resulted in a false reading, that measurement was calculated in the rolling 8-hour average, making it appear in the data as though it was a long-lasting event. These events were flagged in the data so that these data would be noted as “false positive” measurements.

Results:

After the AreaRae measurements were reviewed and flagged for usability, as summarized in the report, EPA has the following conclusions regarding the data.

- Overall, the measurements appeared to be typical for an urban environment and, after the usability determination, may be used for comparison to future AreaRAE measurements collected during activities that would require breaching the cover of the landfill.
- CO was detected by the instruments in discrete events lasting several minutes. These events appeared to occur somewhat regularly at each of the air monitoring stations (including the “background” station—Station 5) during the summer and fall months. The short durations of these events suggest presence of one or more CO sources near the detectors, possibly engine exhaust from nearby vehicles, emergency generators (Stations 2 and 5 are located near fire station emergency backup generators that are tested weekly), or lawn maintenance equipment.

March 20, 2015

- SO₂ sensor readings above the threshold value of 2 ppm occurred less frequently than CO sensor readings above 10 ppm, but often coincided with CO events and also occurred over short durations lasting minutes or less.
- H₂S measurements occurred only at Station 5—the “background” station. The measurements, which occurred mid-day over 5 consecutive days between July 10 and 14, 2014, are difficult to explain because after further analysis, they correlated with changes in temperature (generally increased with increasing temperature and decreased with decreasing temperature), but not with changes in wind direction. These measurements do not appear to be attributable to any source, including the landfill, but rather may be due to a problem with the instrument.
- Due to the limited accuracy of the instrument measurements at levels less than the amounts of the chemicals of interest, a comparison with chronic health risk-based levels was not possible. In order to make this comparison, different sampling instruments and methodologies would need to be employed.

Key Messages:

- The field air monitoring measurements obtained by EPA do not indicate off-site CO, H₂S and SO₂ levels of concern and do not demonstrate a discernable impact from the nearby landfill.
- The use of the AreaRae instruments have been found to be useful for detection of releases that could cause acute exposures of concern, but likely unusable for comparison to chronic health-based standards close to or less than the instrument’s minimum increment of detection of 0.1 ppm. If deemed necessary monitoring equipment with lower limits of detection should be employed to determine concentrations below 0.1 ppm.

Since the air monitoring began landfill gas sampling results provided by Bridgeton to MDNR/DHSS indicate that the flares located on site may be producing a significant amount of SO₂. MDNR is working with Bridgeton to address the gas collection and sulfur technology to ensure that it is operating with the permitting requirements of the Clean Air Act.\